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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/634,434	08/05/2003	David Cope	EMI.1002	8296

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EXAMINER
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RUTLAND WALLIS, MICHAEL

ART UNIT	PAPER NUMBER
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2835

DATE MAILED: 04/13/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/634,434

Applicant(s)

COPE ET AL.

Examiner

Michael Rutland-Wallis

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 21 March 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-19 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 January 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Response to Arguments*

#### *Drawings*

In view of applicant's amendment to the drawings the previous objection to the drawings is withdrawn.

#### *Claim Rejections - 35 USC § 102*

Applicant's arguments addressing claims 1, 12-13 and 18 rejected under 102(b) as anticipated by Liu. Applicant's amendment to at least independent claims 1 and 13 removing the limitation "harmonic" as applicant holds Liu teaches a system of compensating harmonic frequencies generated in a transmission line and not to evaluating and compensating DC current. The presence of harmonics in a transmission line leading to the generation and problem of DC currents, a 9 page IEEE publication *Harmonics In Power Systems* is cited and attached to this action as providing a discussion on this phenomenon see particularly pages 5 and 7 sub topic headings "Harmonic Mitigation" and "Problems Generated by Harmonics". Additionally Hingorami (U.S. Pat. No. 4,292,545) teaches a system and method intended to compensate harmonic oscillations and DC offset. While neither *Harmonics In Power Systems* or Hingorami is cited with the intention of anticipating or to render obvious applicant's invention, each is cited merely to support the office's position a device or system compensating harmonics in a transmission line is also tied to compensating and reducing the presence of DC current in transmission lines.

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Nevertheless applicant's remaining amendments to at least claims 1 and 13 addressing lacking of the teaching of evaluation of an amount of DC current in a transmission line are no longer anticipated by Liu, therefore a new grounds of rejection is made below.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-5, 7-8 and 12-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kern (U.S. Pat. No. 6,282,104) in view of Liu (U.S. Pat. No. 5,521,487)

With respect to claims 1, 13 and 19-20 Kern teaches a DC mitigation circuit (column 3 lines 13-36), comprising: a control circuit (item 40) for evaluating (Kern uses a feedback control loop item 30 and items 32 and 34 to evaluate the DC and harmonics in a transmission line) an amount of DC current resulting from the DC in a transmission line (such as leads 42 and 50). While Kern is silent on the use of switches for providing current into the windings of a transformer, Kern does teach the injection of a current signal by DC offset adjust device item 24 on lead 62 to adjust the DC and harmonics entering the windings of a transformer. Liu provides a teaching of using switches (Fig. 1

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item 10 and 11 solid state switches comprising a IGBT or thyristor switch) for providing a current into a winding of a transformer, in order to mitigate or dampen harmonic frequencies which in turn produce the DC current in the transmission line, wherein the windings of the transformer of Liu generates a magnetic flux that offsets a flux created by said DC or harmonic current resulting from the DC in said transmission line (column 3 line 57 – column 4 line 24). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Kern to use an connection to a transformer by switches of Liu to mitigate the DC and harmonics in a transmission line to simplify the device and to provide a clean and level power signal provided to loads.

With respect to claims 2, 12 and 17 Kern as modified by Liu teaches the control circuit evaluates an amount of harmonic and non-harmonic AC current resulting from the DC in the transmission line see harmonic analyzer item 38 and current transformers items 32 and 34 of Kern for example which determines whether a harmonic AC current exists or if a DC current is present and Kern as modified by Liu teach the mitigation of such harmonic and DC current would be through offset flux generated in the windings of the transformer .

With respect to claim 3 Liu teaches DC mitigation circuit is connected to an output filter (Fig. 1 item 9) for filtering an output of said switches.

With respect to claim 4 Liu teaches the control circuit is connected to a primary winding of said transformer (Fig. 1 column 2 lines 1-20).

With respect to claim 5 Liu teaches control circuit is connected to a secondary winding of said transformer (Fig. 1 column 2 lines 1-20).

With respect to claim 7 Liu teaches the switches are connected to a tertiary winding (Fig. 1 item 5) of said transformer.

With respect to claim 8 Liu teaches the DC mitigation circuit of claim 1, further comprising a capacitor (Fig. 1 item U1) for powering said switches.

With respect to claim 14 Liu teaches the current supplied to said transformer winding is provided by an internal power supply (Fig.1 item U2).

With respect to claim 15 Liu teaches the switches are used to control said current that is outputted from said power supply to said transformer winding (Fig. 1 see column 3 lines 20-35).

With respect to claim 16 Liu teaches the step of filtering said current output from said switches (Fig. 1 item 9).

With respect to claim 18 Liu teaches the switches may be integrated IGBT type switches.

Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kern (U.S. Pat. No. 6,282,104) in view of Liu (U.S. Pat. No. 5,521,487) as applied to claim 1 above, and further in view of Oliver (U.S. Pat. No. 5,179,489)

With respect to claim 6 Kern as modified by Liu teaches the control circuit is connected to said transformer but does not teach the connection to the core of the transformer. Oliver teaches connecting a filter to the core of a transformer. It would have been obvious to one of ordinary skill in the art at the time of the invention to move Liu's connection point to the core to increase the efficiency of the of the transformer.

Claims 9-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kern (U.S. Pat. No. 6,282,104) in view of Liu (U.S. Pat. No. 5,521,487) as applied to claim 1 above, and further in view of *A Practical Approach to Harmonic Current Compensation by a Single-Phase Active Filter*.

With respect to claim 9 Liu teaches the use of the capacitors associated with the switches but does not teach the use of the diodes used in conjunction with the switches. *A Practical Approach to Harmonic Current Compensation by a Single-Phase Active Filter* in Fig. 1 teaches the use of switches further comprise diodes connected across said switches so as to charge said capacitor during a frequency cycle. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Liu to use a diodes connected across the switches to discharge the capacitor and supply the transformer and filter with power.

With respect to claim 10 Liu teaches the device of claim 1 and the use of a source connected across the switches in Fig. 1 but does not teach the use of the teaches switches being MOSFETs and diodes carry current in an opposite direction from said MOSFET switches. *A Practical Approach to Harmonic Current Compensation by a Single-Phase Active Filter* in Fig. 1 teaches switches being MOSFETs and diodes connected across a source and drain of said MOSFET switches so as to carry current in an opposite direction from said MOSFET switches (Fig. 1). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Liu to use a diodes connected across the switches connected to Liu source in control the source.

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With respect to claim 11 Liu teaches said capacitor discharges during said frequency cycle so as to power said MOSFET switches. *A Practical Approach to Harmonic Current Compensation by a Single-Phase Active Filter* in Fig. 1 teaches diodes which are configured to discharge the capacitor during a frequency cycle. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Liu to control the discharge of the capacitors.

### ***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Chou et al. (U.S. 6,717,465) teaches a state of the art harmonic suppression system for transmission lines.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Rutland-Wallis whose telephone number is 571-272-5921. The examiner can normally be reached on Monday-Thursday 7:30AM-6:00PM EST.

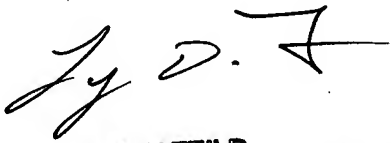
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lynn D. Feild can be reached on 571-272-2092. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.



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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MRW

  
LYNN FEILD  
SUPERVISORY PATENT EXAMINER